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the benefits of the lessons to all towns near Boston. The school now has agents interested in the proper distribution and use of its tickets, not only in Boston, but also in the larger number of the suburban towns which cluster around that municipality.

The following statistics of this winter's courses will speak for themselves with regard to the probable benefits of this extension of its efforts over a wider field:—

Subjects.	Applications received.	Tickets sent
Physical geography	988	1,098
Physiology	834	945
	1,822	2,043
Distribution of Tickets.	Phys. geog. Physiol.	
Boston	364	302
Neighboring towns (45)	589	512
Complimentary, school authorities and private persons	145	131
	1,098	945

Grade of teachers: Superintendents, 10; sub-masters, 24; principals, 157; assistants, 847. The average attendance so far upon the first course has been from six to seven hundred.

The school has also had another branch in active operation, in which the courses are paid for by the teachers themselves. The curator, assisted by Mr. Van Vleck, has had two classes in zoölogy occupying four winters, and numbering in all fifty-nine teachers; Mr. B. H. Van Vleck, a class in physiology numbering fifteen teachers; and Mr. W. O. Crosby, a special class in geology. These classes have demonstrated a demand for the kind of knowledge offered, so earnest that a good proportion of the teachers have been willing to surrender their holidays to laboratory work, and also to pay for the privilege. A number more would have attended but for the obstacle of the fee necessarily charged for tuition. These classes, now that the reality of this demand has been shown, should be placed on a more liberal basis, and one more consistent with the usual policy of the society with regard to the needs of our public schools. Owing to a combination of causes which it would be useless to detail, these laboratory courses formerly given every Saturday throughout the winter have been discontinued during this season. It is intended to resume them as soon as practicable.

Academy of natural sciences, Philadelphia, Penn.

Instruction in mineralogy and lithology.—At the close of Prof. Heilprin's lectures, Prof. H. Carville Lewis will deliver a course of instruction in mineralogy and lithology, a large portion of which will consist of a series of field-lectures upon the mineralogy and lithology of Philadelphia and vicinity. In addition to lectures at the academy, and alternating with them, there will be about ten short excursions to interesting localities in the neighborhood of the city, where the strata and their enclosed minerals will be studied in place, and practical methods given for recognizing both rocks and minerals and their relation to the geology of the region. The specimens collected in the field will be more carefully examined and studied with laboratory practice at the academy at the lecture following each excursion.

The introductory lecture will be delivered on Tuesday, April 17, 1883, in the lecture-room of the academy, at 4.15 P.M.; and the lectures will continue at the same hour on successive Tuesdays and Fridays. The field-lectures, commencing early in May and

continuing until July, will take place on Fridays (weather permitting), and will occupy the greater part of the day.

Among the localities visited will be the quarries of hornblendic gneiss at Germantown and Frankford, the soapstone quarries on the Schuylkill, the limestone and marble quarries, and the iron-mines of the Montgomery County Valley, the lead, zinc, and copper mines near Phoenixville, the mineral localities of Delaware County, etc.

NOTES AND NEWS.

—The description of the fossil remains of the remarkable flying reptile, *Rhamphorhynchus phyllurus* Marsh, which was given in the American journal of science in April, 1882, has been supplemented by the liberal distribution of casts of the original by Prof. O. C. Marsh. These are faithful representations in all the more important characteristics prominent enough to make their re-appearance upon a plaster casting. The wings and caudal paddle are the most important features, and render this fossil unique of its kind. The wings are particularly well rendered, and perfectly distinct in outline and details. The steering-paddle at the end of the long, attenuated tail, and the tail itself, is distinct in outline, but deficient in details; the bones of the hands are also in the same state, all these parts being very small.

Professor Marsh, in distributing these and other casts of his rare and remarkable fossils, has added very greatly to the usefulness of his own work and the diffusion of knowledge, besides setting a shining example of scientific liberality. He has, we know, in several instances, and we presume in all cases, demanded no exchange of any kind. Many institutions now have the means of placing before visitors and students the actual condition of the fossil remains of one of the most remarkable of the extinct Jurassic reptiles. This is so nearly perfect that it shows there is no exaggeration in the restoration accompanying Professor Marsh's descriptions, which represents this pterodactyle flying through the air with its wings expanded.

—The following persons were elected officers of the biological society of Washington, on Jan. 5: President, Prof. C. A. White; Vice-Presidents, Prof. C. V. Riley, Prof. Lester G. Ward, Mr. William H. Dall, Prof. Theodore Gill; Secretaries, Mr. G. Brown Goode, Mr. Richard Rathbun; Treasurer, Dr. Tarleton H. Bean; Members of Council, Dr. George Vasey, Dr. D. Webster Prentiss, Prof. Otis T. Mason, Mr. Frederick W. True, Dr. Elliott Coues.

—At the meeting of the Albany institute held Jan. 16, officers of the institute at large and of its three departments were chosen for the ensuing year. The following, by virtue of their offices, constitute the executive committee provided for by a recently adopted by-law: President, Orlando Meads, LL.D.; Treasurer, John Templeton; Recording secretary and libra-

rian, Daniel J. Pratt, Ph.D.; Corresponding secretary, Leonard Kip; President of first department and one of the vice-presidents of the institute, David Murray, LL.D.; President of second department and one of the vice-presidents, J. A. Lintner; President of third department and one of the vice-presidents, Henry A. Homes, LL.D.

— Some oysters have recently been received by Lieut. Winslow of Washington, from Barnegat, N.J., which seem ready to spawn,—an unusual condition of matters, since the spawning season at that latitude is supposed to be at an end in August.

— The bronze statue of Professor Joseph Henry, by W. W. Story, has arrived in America. The ceremony of unveiling will take place upon the grounds of the Smithsonian institution in April, during the session of the National academy of sciences.

— The annual meeting of the regents of the Smithsonian institution was held in Washington on Jan. 17. All the regents were in attendance except Dr. Noah Porter and Mr. Peter Parker. Professor Baird reported upon the state of the finances as follows: receipts for 1882, \$67,435.52; expenditures, \$37,798.07; balance available to July 1, 1882, \$29,637.45. At the suggestion of Dr. Maclean, Professor Baird was appointed to collect and publish the scientific writings of Dr. Henry.

— Dr. Orville Derby, curator of geology in the national museum of Brazil, has recently arrived in Washington. He will complete the arrangements for the publication of the results of the geological survey of Brazil, organized under the late Prof. C. Fred. Hartt. Dr. C. A. White is preparing the report on the cretaceous mollusks and echinoderms. He has already completed the sections of conchifers, gasteropods, and cephalopods. Twenty-four quarto plates are drawn and finished. Ninety per cent of the species are new. Three new genera of gasteropods have been described. The whole work upon invertebrates will comprise as much matter as has been hitherto published on the same subject for all South America, and will undoubtedly form an epoch in the development of the invertebrate paleontology of that continent.

— At the meeting of the Boston society of natural history on Feb. 7, Dr. M. E. Wadsworth gave some instances of atmospheric action on sandstone. Mr. Lucien Carr discussed the social and political position of woman among the Huron-Iroquois tribes, and Mr. John A. Jeffries spoke of the dermal appendages of birds.

— At the meeting of the Appalachian mountain club Feb. 14, Mr. W. H. Pickering exhibited, with the lantern, photographic views taken during the club's recent excursion to the White Mountains; and Mr. J. Tatlock, jun., read a paper on the principal coefficients in the barometric formula of Laplace, as applied to the White-Mountain region.

— At the thirty-second annual meeting of the Michigan state teachers' association, held at Lansing, Dec. 27-29, papers were read by J. S. Crombie on The need of visible illustration, and the proper use of apparatus; by H. R. Pattengill, on Science in primary schools; and by Prof. V. M. Spalding, on The microscope in our public schools. An exhibition of microscopic objects and apparatus took place at the evening session the first day.

— At a meeting of the American philosophical society, held at Philadelphia on Feb. 1, Prof. J. T. Rothrock read a paper on Some microscopic distinctions between good and bad timber of the same species.

— The American institute of mining engineers will hold its annual meeting in Boston next week. The opening session will be at the Brunswick hotel on Tuesday evening, when addresses of welcome will be given by Mr. Edward Atkinson, and, on behalf of the Boston society of civil engineers, by Mr. Thomas Doane. Papers will be read at this session as well as at the sessions held on Wednesday and Friday at the Massachusetts institute of technology, and on Thursday afternoon at Sever hall in Cambridge. Excursions will be made on Wednesday, to the Leavitt pumping-engine, the Carson sewer-excavating apparatus, and the Norway iron-works; on Thursday, to the Watertown arsenal to inspect the U. S. testing-machine, and to Harvard university; after the session, to Lowell and to Worcester to visit the manufactoryes and institutions of those cities. The subscription dinner is to be at the Brunswick, at eight o'clock on Thursday.

The following papers have been announced: Gas-producer explosions; by P. Barnes, Elgin, Ill.—Microscopic analysis of the structure of iron and steel; by J. C. Bayles, N. Y.—Metallurgy of nickel in the U.S.; by W. P. Blake, New Haven.—The mining regions about Prescott, Arizona; by John F. Blandy, Prescott.—The collection of flue-dust at Ems; by T. Egleston, N.Y.—The eozoic and lower paleozoic in South Wales, and their comparison with their Appalachian analogues; by Dr. Persifor Frazer, Philadelphia.—Note on the geology of Egypt, with especial reference to the rocks from which the obelisks have been taken; by Dr. Persifor Frazer.—Notes on a protected iron hot-blast stove; by Frank Firmstone, Easton, Penn.—The shop treatment of structural steels; by A. F. Hill, N. Y.—A suggestive cure for blast-furnace chills; by H. M. Howe, Boston.—Coal and iron of Alabama; by T. Sterry Hunt, Montreal.—Lines of weakness in cylinders; by R. H. Richards, Boston.—The strength of American woods; by S. P. Sharples, Boston.—Determination of manganese in spiegel; by G. C. Stone, Newark, N. J.—History and statistics of the manufacture of coke; by J. D. Weeks, Pittsburg, Penn.—Notes on settling-tanks in silver-mills; by Albert Williams, jun., Washington.

—That most enterprising of our scientific societies at the west, the Davenport academy of natural sciences, is about to complete the third volume of its 'proceedings' by the publication of the memoir on Solpugidae nearly completed by its late president, J. D. Putnam, a young naturalist of rare promise and industry. The publishing committee, with commendable enterprise, are endeavoring to procure sufficient subscribers to the number to pay the cost of publication, and have already secured 140 of the 180 required. Mr. Putnam's paper is edited by Prof. H. Osborn, of Ames, Iowa; and its four plates engraved under the superintendence of Dr. H. A. Hagen of Cambridge. A portrait of Mr. Putnam will accompany the paper.

—At the meeting of the Biological society of Washington, Feb. 2, an adjourned discussion of the presidential address took place; Dr. Elliott Coues read a paper on Zoölogical nomenclature applied to histology; and Prof. O. T. Mason, on the Human fauna of the district of Columbia.

—The January number of the Harvard university bulletin, recently issued, commences a new volume. We miss the 'notes' which formed such an admirable feature of the last volume, but are glad to know that they will again be resumed. Two pages and a half are given up to the accessions to the University library in science, in which we note a collation of the copies of the several volumes of Wilkes's exploring expedition in the libraries of Cambridge and vicinity. Of interest to scientific men are Mr. Bliss's classified index to the maps in Petermann's mittheilungen (six pages more of which are given), and Mr. Winsor's commencement of a bibliography of Ptolemy's geography.

—No. 4 of the Library of Cornell University for January contains fourteen additional pages of the valuable classed list of the rich collection of works relating to mathematics in that institution, making forty-five pages so far published. Both main and subordinate topics are arranged alphabetically; and the present instalment completes astronomy, and gives, in addition, calculus, engineering, functions, etc., and enters geometry.

RECENT BOOKS AND PAMPHLETS.

Acadian scientist (The): published in the interests of the Acadian science club. vol. i, no. 1. Wolfville, N. S. 1883. 8 p., m. 4°.

Balitet, C. De l'action du froid sur les végétaux pendant l'hiver 1879-80. Paris, Masson. 1882. 340 p. 8°.

Boston.—Archæological institute of America. Bulletin, i. Boston, Williams. 1883. 40 p. 8°.

Cohn, F. Die pflanze. Vorträge aus dem gebiete der botanik. Breslau. 1882. 8°.

Crowther, J. The unwritten record; a story of the world we live on. With an introductory note by J. R. Macduff. Lond., Sunday School Union. 1883. 178 p. 8°.

Delattre, C. Étude sur les gisements français de phosphate de chaux; note sur la décomposition du phosphate bicalcigne par l'eau. Paris, imp. Davy. 1882. 80 p. 8°.

Delaurier, E. Essai d'une théorie générale supérieure de

philosophie naturelle et de thermochimie, avec une nouvelle nomenclature binaire notative pour la chimie minérale et organique. Fasc. i. Paris, imp. Lahure. 1882. 82 p. 8°.

Dunman, T. Talks about science; with a biographical sketch by C. Welsh. New ed. Lond., Griffith. 1883. 250 p. 8°.

Dreyfus-Brisac, E. De la liberté d'enseignement. Paris, Masson. 1882. 46 p. 8°.

Geikie, A. Geological sketches at home and abroad. Lond., Macmillan. 1882. 8°.

Harting, J. E. Essays on sport and natural history. Lond., Cox. 1883. 490 p. illustr. 8°.

Madison. Washburn observatory. Publications. Vol. i. Madison. 1882. 8°.

Middletown.—Museum of Wesleyan university. Eleventh annual report of the curator. Middlet., Pelton and King, pr. 1882. 13 p. 8°.

Moleschott, J. K. R. Darwin. Denkrede gehalten im collegio romano zu Rom. Giessen. 1883. 47 p. 16°.

Miller, S. A. The American palaeozoic fossils: a catalogue of the genera and species, with names of authors, dates, places of publication, groups of rocks in which found, and the etymology and signification of the words, and an introduction devoted to the stratigraphical geology of the palaeozoic rocks. Cincinnati. Author. 1877. 16+246 p. 1883. P. 247-334. 8°. P. 247-334 form a supplement.

Morel, C., et Duval, M. Manuel de l'anatomiste. Paris, Asselin. 1883. 14+1152 p. illustr. 8°.

Nadaillac, marquis de. L'Atlantide et les oscillations de l'écorce terrestre. Paris, Gervais. 1882. 24 p. 8°.

Noack, Ernst. Ueber die phylester der phosphorigen säure. Inaug. diss. Tübingen, Frees. 1882. 42 p. 8°.

Oppolzer, T. von. Lehrbuch zur bahnbestimmung der kometen und planeten. 2. aufl. i bd. Leipzig, Engelmann. 1882. 12+683 p. 8°.

Pasch, M. Vorlesungen über neuere geometrie. Leipzig. 1882. 8°.

Quenstedt, F. A. Die schöpfung der erde und ihre bewohner. Stuttgart. 1882. 59 p. 8°.

Questions controversées de l'histoire et de la science. 3e série. Paris, Tardieu. 1882. 333 p. 8°.

Rehm, H. Ascomycetes lojkani lecti in Hungaria Transsylvania et Galicia. Budapest. 1882. 4+70 p. 8°.

Reinsch, P. F. Mikrophotographien über die strukturverhältnisse und zusammensetzung der steinkohle des carbon, entnommen von mikroskopischen durchschnitten der steinkohlen. Leipzig, Weigel. 13 p., 13 pl. 4°.

Richthofen, F., freiherr von. China. Ergebnisse eigener reisen und darauf gegründeter studien. iver bd. Palaeontologischer theil. Berlin. 1883. illustr. 4°.

Rusz, Karl. Die sprechenden papageien. Berlin, Gerschel. 1882. 16+404 p. 8°.

Simony, Friedrich. Gletscherphänomene. Wien, Höltzel. 1883. 24 p., pl. 8°.

Stützenberger, E. Lichenes helveticorumque stationes et distributio. Fasc. i. St. Gallen, Köppel. 268 p. 8°.

Strassner, H. Zur lehre von der ortsbewegung der fische durch biegungen des liebes und der unpaaren flossen, mit berücksichtigung verwandter locomotionsformen. Stuttgart. 1882. 8°.

Sydney, N. S. W.—Observatory. Results of double star measures made at the observatory, 1871 to 1881, under the direction of H. C. Russell. Sydney. 1882. 68 p. 8°.

Thomas, Cyrus. A study of the manuscript Twano; with an introduction by D. G. Brinton. (U.S. geogr. geol. surv. Rocky Mt. region.—Contrib. Amer. ethnology v.) Wash., Government. 1882. 37+237 p., 9 pl. 4°.

Thomsen, Jul. Thermochimische untersuchungen. ii. bd., metalloide. Leipzig, Barth. 1882. 14+506 p., pl. 8°.

U.S.—Light house board. Annual report for the year ending June 30, 1882. Wash., Government. 1882. 8°.

Vaile, O. E. Pro and con of spelling reform. Ed. by Eliza B. Burnz. N.Y., Burnz. 1882. 16 p. 12°.

Vogt, C. et Yung, E. Traité d'anatomie comparée pratique. Livr. i. Paris, Reinwald. 1883. 80 p. 8°. To be completed in 12 parts.

Vogt, K., and Specht, F. Diesägetiere in wort und bild. Lief. i. München. 1882. illustr. f°.

Wake, C. S. The origin and significance of the great pyramid. Lond., Reeves. 1883. 98 p. 8°.

Wright, L. Light: a course of experimental optics, chiefly with the lantern. London. 1882. illustr. 8°.

Wood, T. Practical lessons on insect life. Lond., Hughes. 1883. 172 p. 12°.